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'Formula Zero' kart race could drive fuel cell technology

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Vicki Cleave, Rotterdam

The world's first international fuel-cell-powered go-kart race took place in Rotterdam, the Netherlands, on Saturday. Six teams participated in the "Formula Zero" event, which is aiming to be a zero-emissions alternative to today's high-performance "Formula 1" car races.

The six teams used go-karts powered by fuel cells, which electrochemically combine hydrogen with atmospheric oxygen to produce electrical power and an exhaust of pure water, producing zero carbon-dioxide emissions.

But instead of the fuel cells charging a battery, as called for in designs for fuel-cell-powered road cars, the cells charged supercapacitors. These devices, which store energy in the electric field between two conducting plates, discharge more quickly than batteries, giving the karts more kick.

The race had two components – an endurance event and a sprint. For the endurance event, karts had to complete six laps of a 533-metre-long track in the fastest time possible. For the sprint, karts were timed as they completed one lap after a flying start, where they started accelerating before the beginning of the lap.

A team called EuplatechH2 from Zaragoza, Spain, won the sprint, finishing one lap in just over 36 seconds, sustaining an average speed of 53 kilometres per hour.

Wind power

The endurance event proved trickier. Two teams were unable to compete because they couldn't get their karts working in time for the race, and the remaining teams made unscheduled stops on the track.

It is not entirely clear why the karts stopped, but race cars are harsh environments for fuel cells. Getting so much power out of the cells in a short amount of time takes complex control systems to prevent problems such as overheating.

In the end, a team called Greenchoice Forze from the Netherlands' Delft University of Technology took first place in the endurance event.

The founders of Formula Zero, Godert van Hardenbroek and Eelco Rietveld, love fast cars and want to race them in an environmentally friendly way.

"In the sustainable future that we want to live in, you can still drive around in circles just because



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The EuplatechH2 team (front) and Greenchoice Forze (behind) - which each won a race event - lined up in the pits before heading out onto the track. The fuel cell is clearly visible next to the driver in the EuplatechH2 kart (Image copyright: Chris Nobbs 2008)



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A team called Imperial Racing Green raced in the six-lap endurance event (Image copyright: Chris Nobbs 2008)

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you want to," says van Hardenbroek. Indeed, wind power was used to electrolyse water and produce the hydrogen that powered the carts, making the races - if not the whole event - sustainable.

Public awareness

By 2015, Formula Zero plans to race full-size cars from professional teams. While this first race used a single fuel cell design – purchased from the Canadian firm [Hydrogenics](#), competing teams will ultimately be able to choose their own fuel cells.

"Formula Zero will be a competition between fuel cell technologies," says van Hardenbroek.

Jerry Hardcastle, vice president of Nissan Technology Centre Europe, says this sort of event is "complementary" to the company's own efforts in promoting new technologies, such as fuel cell cars.

"One of the issues in introducing new technologies is customer awareness and acceptance, and anything which demonstrates or supports that is welcomed," he told **New Scientist**.

He also feels that such competitions, which often involve university teams, help train future engineers. "The students that are doing these events now are potentially the managers of our technology centres in 10 or 15 years' time."

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